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ABSTRACT

This package from the Tennessee Valley Authority (TVA) describes projects undertaken by TVA's Skills Development Program, an effort to help national, state, and local officials improve education. The program includes several futuristic instructional labs that TVA helped to design and install in Morgan County, Tennessee. Instructional labs have been developed in dropout prevention, career guidance, mathematics, science, and video encyclopedia research. In cooperation with other organizations, TVA also developed a directory on interactive videodisk courseware for all grade levels. TVA and Vanderbilt University examined the effectiveness of Mastering Fractions, one of five videodisk mini-courses developed by Systems Impact Inc. The study of four school districts in three states found that using Mastering Fractions resulted in statistically significant achievement gains in knowledge of fraction skills and concepts. Also included in the package is information on the "Levels of Interactivity of Various Videodisc Configurations in TVA's Rural Education Demonstration at Coalfield School (in Morgan County)." Each level of interactivity lists the necessary equipment, TVA's source for the equipment, and the price. The document also lists the demonstration objectives, instructional methodology, and benefits of interactive video instruction. (TES)

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ROLE OF TVA'S SKILLS DEVELOPMENT

The Tennessee Valley Authority since its beginning has recognized the relationship between education and skills training, industrial growth and development, and employment for Valley residents. TVA's Skills Development program strives to develop collaborative demonstrations to serve as prototypes that help raise the levels of educational achievement and skills training in the Valley region with potential for national replication. The responsibility for public education lies clearly in the hands of State and local governments; however, the need for educational improvement is so great that TVA has been urged by State and local leaders to become an active participant in these efforts. TVA (through formal, coordinated efforts) has helped establish a sound resource base resulting in quality education, expanded productivity, industrial growth, and new opportunities to help improve the overall quality of life for citizens of the region. TVA's efforts directly interface with national, State, and local departments of education to develop, expand, and strengthen curricula, while upgrading faculty by providing new and innovative teaching methods with a high degree of efficiency and credibility.

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BACKGROUND MATERIAL

RURAL EDUCATION DEMONSTRATION/FUTURISTIC

INSTRUCTIONAL LABS

Coalfield School in Morgan County, Tennessee, is the site designated for TVA's rural education/futuristic instructional lab demonstration. As a result of TVA's laserdisc interactive research, the Vanderbilt Report and other documented laserdisc research showing significant gains of learning with this technology, staff has been working with private developers nationwide and has compiled a directory on interactive videodisc courseware with substantive instructional value according to all grade levels. Futuristic instructional labs have been designed and are now operational in Morgan County. Instructional labs have been developed in dropout prevention, career guidance, mathematics, science, and video encyclopedia research. The project is a cooperative national demonstration among TVA, National School Board Association, Morgan County Board of Education, Vanderbilt University, Tennessee Department of Education, and private industry. TVA, Morgan County School System, and Vanderbilt University will be participating in an intensive research project to measure the significant learning gains and teacher upgrading by utilizing this technology. Delivering educational programs by use of this technology could prove to be effective to overcome rural education deficiencies due to lack of resources.

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FUTURISTIC METHOD OF INSTRUCTIONAL LABS

KINDERGARTEN - HIGH SCHOOL DEMONSTRATION

I. Purpose

Since society is moving through a transitional period from the industrial age to the information age, the demands on education and training accelerate. Although new knowledge is increasingly available, better mechanisms are required for organizing and presenting that knowledge so individuals can assimilate and apply it. Using laser videodiscs to carry the practices of master teachers into classrooms is one mechanism that is presently being accepted as a method to substantially improve the student's learning. A comprehensive evaluation conducted in four districts in three States by Vanderbilt University's George Peabody College and sponsored by TVA concluded these facts. The study examined the effectiveness of Mastering Fractions, one of five videodisc mini-courses developed by Systems Impact, Inc. Overall, the study found that using Mastering Fractions resulted in statistically significant gains in fraction skills and concepts. Students in all classes using the disc made significantly higher pre-post test gains in scores than students in the control group. Average students using the disc showed a 97 percent gain in post-test scores, while the average control group showed a 30 percent gain. The study concluded that videodiscs provide educators "with the ability to capture high quality interactive instructional sequences that can be easily transported from classroom to classroom without a resultant degradation in the quality of instruction."

II. Objective

As a result of the laserdisc research, math and science laserdisc projects, the Vanderbilt Report and other documented laserdisc research, staff has researched and compiled a directory on videodisc courseware with substantive instructional value according to all grade levels (elementary, middle school, high school, and postsecondary levels). Plans are to use the laser videodisc teaching technology as a more effective means of instruction by identifying a school in the Valley region and designing a futuristic method of instructional labs in order to demonstrate this technology.

III. Methodology

Since the comprehensive instructional videodiscs are designed and field tested to meet the needs of the classroom teacher, the project will be coordinated through State departments of education at all levels. The curriculum content of the videodiscs will be selected to ensure compatability with the curriculum content taught in the public school. Teacher's manuals and other supportive materials will accompany the videodiscs at training sessions. Some of the videodiscs are designed so that they can be used with small and large groups, as well as individually. This will meet the needs of some of the subjects in the core curriculum such as math, science, English, and other courses. Mobile labs will be established for the math and science departments in order to better utilize the materials available in fractions, decimals, ratios, percents, Trigonometry, and Algebra.

The science department will be able to benefit from the Basic Chemistry, Bio Science, Earth Science, Life Science, and Astronomy. Five individual learning labs will be established in the library to meet the needs of student remediation, tutorial, career guidance, and an invaluable detailed video encyclopedia. The guidance office will provide a unit for career guidance and dropout prevention.

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LEVELS OF INTERACTIVITY OF VARIOUS VIDEODISC CONFIGURATIONS IN TVA'S RURAL EDUCATION DEMONSTRATION AT COALFIELD SCHOOL

Level 0 - This system consists of a linear player. Designed primarily for home entertainment, the system has limited interactive functions.

Level 1 - The features of a Level 1 player include quick frame access, freeze frame and scanning functions, two user selectable audio channels and chapter and picture stops. These features are controlled manually through a remote control device, thus allowing the user to stop the disc, scan forward or backward, jump to specific frames, and to freeze images.

Systems Impact, Inc.
Ms. Beverly Osteen
4400 Mac Arthur Blvd., N.W.
Suite 203
Washington, D. C. 20007
(800) 822-4636 or (203) 342-9369

Level 1 - Mastering Fractions (3 Video disc)
Mastering Decimals and Percents (1 Videodisc)
Mastering Ratios (3 Videodisc)
Chemistry for Biologists (3 Videodiscs)
Earth Science (4 Videodisc)
(2 Pioneer LD-V2000 Laserdisc players, and 2 remote controls included in the amount)

Approximately $8,400.00

Color monitors will be needed.
Additional Laserdisc players and remote controls can be ordered from:

Pro Video Systems, Inc.
Mike Waterhouse
169 Oxmoor Road
Birmingham, Alabama 35209

Pioneer LD-V2000 Laserdisc player	Approximately $550.00
Pioneer RU-6000T Remote control	Approximately $ 49.00
Sharp 25" Color Monitor	Approximately $475.00

The Video Encyclopedia of the 20th Century
CEL Communications, Inc.
515 Madison Avenue
New York, N.Y. 10022
Attention: Monica Digilio
(212) 421-4030

Set of Video Encyolopedia laserdiscs
4 Volume Reference Guide
3 Copies of Master Index
Videodisc Supplemental Index
Users Guide
Pioneer Disc Player LD-V2000 or
equivalent and remote control
Annual update

Approximately $10,000.00

Color monitor will be needed. Additional laserdisc players can be ordered.

Level 2 - The Level 2 player is equipped with an internal microprocessor that adds intelligence to the Level, functions. The computer program that controls the presentation resides on the disc audio track and is loaded from the disc to the microprocessor. The user indicates answers to questions or makes choices through the remote control device used for controlling the disc player. The player responds by branching to different disc segements depending upon the logic of the computer program. This level of interaction is limited by the amount of memory in the microprocessor and by the fact that the computer program can not be altered once it has been placed on the disc.

Interactive, Inc.
Dr. Dale Mann
440 Riverside Drive #117
New York, N.Y. 10027
(212) 663-6415

Dropout Demonstration "Choices"

Pioneer LD-V6010A Laserdisc Player
and RU-V6000T Remote control included with disc and print materials

Approximately $3,500.00

Color monitor will be needed. Additional laserdisc players can be ordered from Pro Video Systems, Inc. for approximately $1,550.00 (LD-V6010A) Remote controls $49.00 (RU-V6000T)

Level 3-Systems at this level consist of a Level 1, or Level 2 player linked to a microcomputer. This configuration allows both computer and videodiscs generated material to be shown on the screen. Branching is controlled by computer software. Because the presentation is driven by the microcomputer a variety of input devices including the computer keyboard, joystick, light pen and touch screen can be used. Additionally responses can be recorded using the computer's external storage devices.

Optical Data Corporation
Attention: Ted Tolles
66 Hanover Road
Box 97
Florham Park, N.Y. 07932
(800) 524-2481

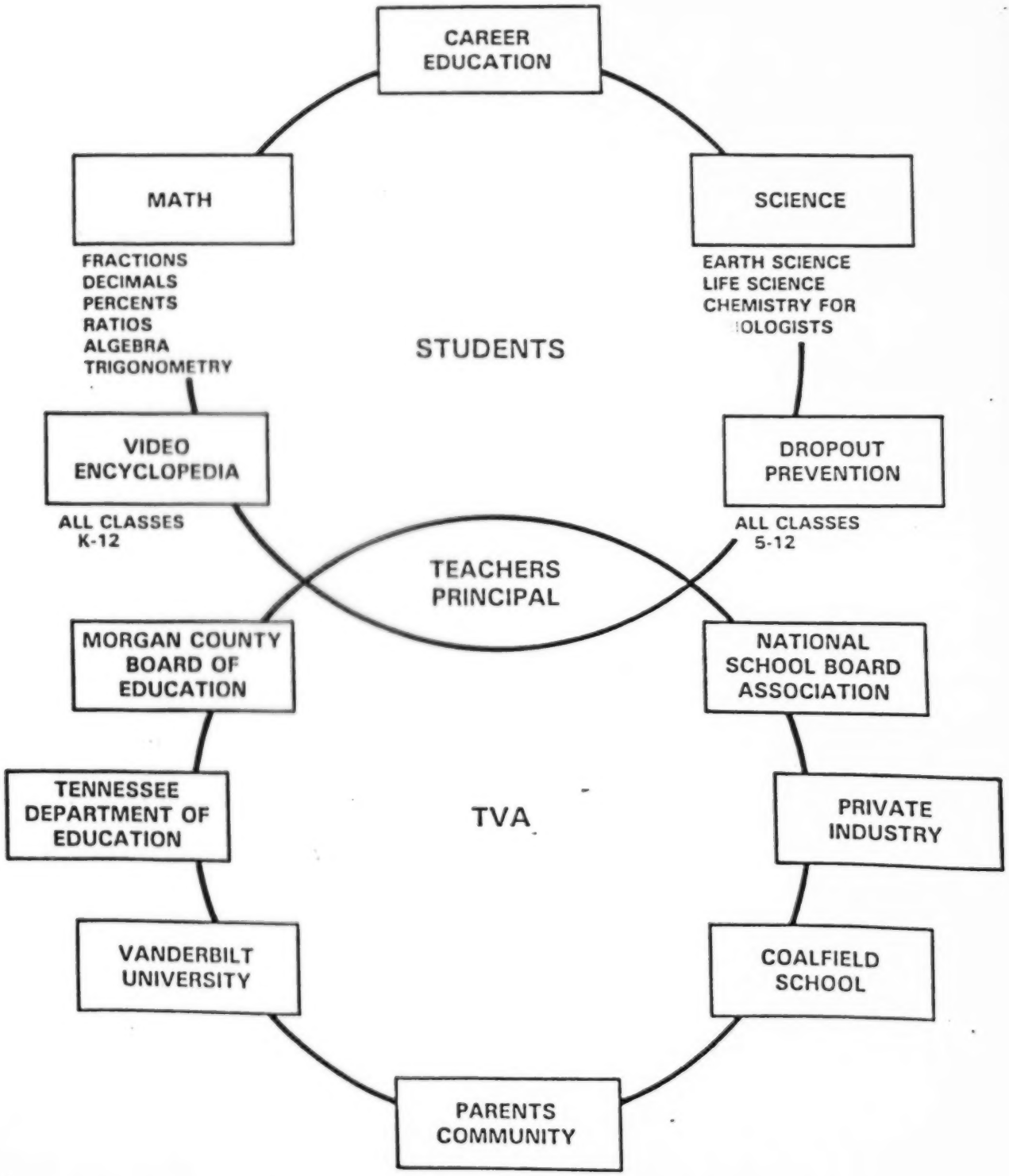
Earth Science Laserdisc — Approximately. $1,200.00
Principles of Biology
Interface #810
Lesson Maker Authoring System
Training Disc

Pioneer LD-V2000 Disc Player	Approximately. $550.00
Remote Control RU-V6000T	Approximately. $ 49.00

Will need color monitor and Apple Computer

Level 4 - A Level 4 system is distinguished from a Level 3 system by the additional power of the microcomputer software. If some type of artificial intelligence software is used it is usually classified as a Level 4 system.

RURAL EDUCATION DEMONSTRATION/FUTURISTIC INSTRUCTIONAL LABS



DEMONSTRATION OBJECTIVES

1. DEVELOP A COMPETITIVE EDUCATION IN RURAL COMMUNITIES.

2. IMPROVE ACADEMIC ACHIEVEMENT USING INTERACTIVE LASER VIDEODISC INSTRUCTION.

3. ENHANCE THE USE OF TECHNOLOGY IN ACADEMIC CURRICULA.

4. INTRODUCE INNOVATIVE TEACHING TECHNIQUES TO ASSIST THE TEACHERS IN EFFECTIVENESS AND PRODUCTIVITY.

INSTRUCTIONAL METHODOLOGY

1. REVIEW (check previous day's work and reteach, if necessary)
2. PRESENT NEW CONTENT/SKILLS
3. GUIDED STUDENT PRACTICE (and check understanding)
4. FEEDBACK AND CORRECTIVES (and reteach, if necessary)
5. INDEPENDENT STUDENT PRACTICE
6. WEEKLY AND MONTHLY REVIEWS

BENEFITS OF INTERACTIVE VIDEO INSTRUCTION

REDUCTION IN LEARNING TIME

- Master subject matter in 25-40 percent less time than traditional methods.

INCREASED LEARNING

- Score 33-70 percent higher on mastery tests than individuals who use a traditional curriculum and methodology (videotape or instructor).

LEARNING RETENTION

- Performance retention after initial instruction is 20-40 percent greater than traditional instruction.

TRAINING COSTS REDUCED

- Less initial instructional time to master the learning material.
- Less remedial training is required.
- Longevity and durability of materials.